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Rhythm

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### **RHYTHM solutions**

i2 provides a comprehensive solution for supply chain planning and optimization. Using the supply chain activities of buy, make, move, store, and sell, this graphic shows how the RHYTHM product suite maps to the planning funnel.

### **Solutions for Logistics**

i2 Technologies and its RHYTHM suite of products provide integrated decision support and planning capabilities for shared logistics providers.

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technology transfer  
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### **alliances**

### **industry focus**

industry-specific RHYTHM models  
industry-specific product development

### **i2's solutions for...**

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*In today's global marketplace, companies are under tremendous pressure to increase service levels while lowering costs—despite the fact that increasing product variability and volatility make this challenge even more difficult. To effectively compete, enterprises need to make accurate delivery promises and be able to meet them. Often, it is the lack of detailed visibility into supply chain operations that prevents companies from quoting accurate dates and meeting customer orders on time. RHYTHM's Order Promising solution improves customer service levels and profitability by enabling companies to confidently make delivery promises to their customers. It does so by providing visibility into the complete demand/fulfillment cycle from the sourcing and procurement of raw materials through manufacturing, transportation, and distribution to customers.*

**order promising****solutions for...**[advanced scheduling](#)[data integration](#)[demand planning](#)[distribution planning](#)[manufacturing planning](#)[order promising](#)[transportation planning](#)**how does RHYTHM fit your specific business needs?**

Today's need for sophisticated order promising capabilities have evolved far beyond the traditional definition of ATP (available-to-promise). Since enterprises employ diverse approaches to how they determine and promise orders to customers, the RHYTHM Order Promising solution can be deployed in many different ways to support the unique requirements of the business. This level of flexibility offered by RHYTHM is far superior to competitive solutions that require the business to conform to a single, specific ATP strategy supported by the solution provider. To make a significant impact on customer service levels, companies require different order promising strategies based upon the operational characteristics of the enterprise supply chain, business unit, the product family or SKU level, or specific customer needs. The speed and flexibility of RHYTHM's Order Promising solution is a reflection of the powerful modeling capabilities supported by the underlying object architecture.

**how does RHYTHM support your global sales organization?**

When used as a global ATP server, RHYTHM is a powerful tool that enables the sales organization to have global visibility into the availability of inventory across the supply chain and to work with real-time, accurate information. In this scenario, RHYTHM interfaces to large-scale ERP order management systems to provide accurate quotes in sub-seconds, the RHYTHM server then runs continuously to

support a global sales organization that can access the ATP server 24 hours a day, 7 days a week. Because of its memory-resident architecture, it can efficiently process more than 100 requests per second.

## **key capabilities of RHYTHM order promising**

### **knowing what your supply chain can actually deliver**

Traditional ATP mechanisms are ineffective because they often rely on estimates to produce delivery date quotations and generally, only support a material-based manufacturing strategy. RHYTHM, on the other hand, generates a constraint-driven plan that simultaneously accounts for demand, material, and capacity, and continually adjusts the plan based on the changing dynamics of the supply chain. Because it considers all the dynamic elements that determine the actual total lead time, it results in an accurate, constraint-based plan that forms the basis to quote reliable promise dates.

### **increased control over how customer demands are satisfied**

RHYTHM can model complex sales organizations including channels, geographic regions, pricing categories, or any sales entity in detail to provide significant control over the demand fulfillment process. Each of these entities can forecast demand, commit to orders, set customer priorities, and manage allocations for all of the products under its domain of control. Since RHYTHM also models the entire hierarchical span of control, a sales entity can also manage the usage of allocations by its subordinate members using complex rules such as first-come first-serve, prioritized allocation, fair share, or any business rule specific to an industry. This flexibility of allocation techniques allows companies to significantly improve customer service levels and profitability.

### **visibility of product availability worldwide**

RHYTHM continuously monitors consumption of orders against allocation. Thus, at any given time, it provides complete visibility of ATP quantities of finished goods and component inventory across all distribution centers and manufacturing plants worldwide. The global sales organization can have visibility to this global ATP whose granularity can be daily or as real-time as needed (or supported by the ERP infrastructure). With this capability, sales organizations can intelligently manage fluctuations or mismatches in demand and supply by moving available inventory from alternate sources other than their designated distribution centers or plants, in order to satisfy the customer order quantity and due date.

### **an extensive modeling environment that offers true flexibility**

Because RHYTHM represents ATP at the component level,

it can promise from both end-item availability and component availability when quoting due dates (commonly referred to as Capable-To-Promise). Additionally, RHYTHM's ability to implement source rules, i.e., entire order on time, partial delivery of order on time, all line items as early as possible in one delivery, and other variations, allows companies to model and implement their business rules more effectively.

### **delivery date monitoring**

Once delivery date promises have been made, it is still necessary to monitor these dates throughout the production and logistics time frame to determine if unexpected events have occurred that will affect the delivery date promise. RHYTHM's delivery date monitoring capabilities include monitoring and managing increased and decreased availability, and reassigning allocations based on demand patterns.

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*RHYTHM's advanced scheduling is the detailed synchronization of all production operations to meet customer goals and optimize resources. It determines the optimal sequence of jobs, taking into account a wide variety of highly realistic and detailed constraints. Scheduling determines the release schedule for the shop floor and generates detailed lists for order execution.*

**solutions for...**[advanced scheduling](#)[data integration](#)[demand planning](#)[distribution planning](#)[manufacturing planning](#)[order promising](#)[transportation planning](#)[alliances](#)[investors](#)[events](#)[jobs@i2](#)[press](#)**how does advanced scheduling differ from planning?**

Whereas planning deals with aggregate quantities and longer time horizons, scheduling sequences individual orders to meet highly specific constraints. Planning coordinates overall supply and demand, while scheduling executes released orders. Finally, planning determines where to deploy inventory throughout the supply chain, whereas scheduling identifies how to meet customer finished goods requirements.

**what is the goal of RHYTHM's solution for advanced scheduling?**

RHYTHM allows manufacturers to drive operations based on actual orders, creating a pull-based production environment both in final assembly and back through feeder lines, component plants, and suppliers. It understands and weighs a broad range of constraints to generate accurate, executable schedules, to synchronize the supply chain, and to improve schedule accuracy and on-time delivery. By considering constraints in the factory, upstream supplier constraints, and downstream logistic constraints, it facilitates reliable supply chain relationships.

**when is advanced scheduling employed?**

Advanced scheduling is used where a high level of detail and highly accurate schedules are required to generate optimum production operations. This includes complex products, products with complicated manufacturing processes, and products with lots of models, configurations or variations. Typical applications include assembly line sequencing, job shop scheduling, and make-to-order manufacturing.

**key capabilities of RHYTHM  
advanced scheduling**

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**automatic genetic algorithm-based optimization**

RHYTHM uses an automatic schedule builder and global optimizer, based on genetic algorithms, to quickly generate high-quality schedules from complex data. Genetic algorithm technology allows RHYTHM to solve complex scheduling scenarios with many different constraints that cannot be solved with traditional optimizers. RHYTHM is also far more robust in the face of changes to constraints, data, or business goals. It makes possible user-modifiable constraints that can be changed easily without programming.

**modeling of a wide range of constraints**

RHYTHM employs an extremely fast constraint-computation engine, which supports global optimization, interactive scheduling, fast rescheduling, and what-if planning. Typical constraints include labor content, model sequencing and spacing, equipment capacities, shipping load optimization, material availability, marketing priorities, and logistics requirements. Users can define both strong constraints which cannot be violated or weak constraints ((scheduling preferences) to create not only *feasible* schedules, but *preferred* schedules.

**intelligent support for interactive manual scheduling**

RHYTHM employs an interactive, intelligent user interface for displays, scheduling results, and interacting with schedules. Highly dynamic and visual displays show schedules and orders in an intuitive format. If manual editing creates constraint violations, the violations are graphically highlighted in bright colors and explained in a nearby window.

**tight integration with on-line systems**

RHYTHM advanced scheduling includes a transaction-based client-server architecture which enables efficient deployment of multi-user and multi-plant scheduling and planning systems. RHYTHM interfaces with existing work order systems, execution and tracking systems to provide updated schedules based on actual completion times. It works well with existing MRP systems to coordinate and identify material shortages.

**quick rescheduling and reaction to changes**

RHYTHM reschedules quickly as conditions change. "Graphical constraints" allow schedulers to quickly enter up-to-the-minute data, such as unplanned material shortages or production glitches. Minor problems can be handled with "drag and drop" schedule editing. For major schedule disruptions, RHYTHM advanced scheduling can automatically reschedule and re-optimize production.

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*The broad scope of global supply chain management requires many applications to work together to provide a seamless solution. These applications include Enterprise Resource Planning (ERP) systems, order management systems, product configurators, Advanced Planning Systems (APS), and execution systems such as Shop Floor Control and Freight Management. These elements represent some of the major components within an enterprise solution. As the leading provider of supply chain decision support and optimization systems, i2 Technologies recognizes that integration of its RHYTHM solution with various complementary technologies is critical to providing a meaningful and usable solution for its customers.*

## data integration

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**what are different types of integration?**

Full integration of the planning process can be achieved where the entire supply chain is always aware of the current state of demand and supply. Depending upon the scope of the specific planning application, integration can range from simple batch file transfers between applications to fully integrated planning and scheduling that includes a real-time exchange of data and decision support. Other considerations such as the number of data sources, control events regarding who initiates what process, and the availability of timely data also determine the integration strategy deployed.

**what enabling technology is used for integration?**

i2 Technologies' [RhythmLink](#) provides the enabling technology that allows the RHYTHM planning engine to integrate with partner applications and systems in order to deliver decision-support capabilities to users throughout the entire supply chain. The [RhythmLink](#) architecture offers:

**flexibility**

[RhythmLink](#) offers several integration options that allow enterprises to quickly deploy RHYTHM and accelerate the time-to-benefit. As the data and planning process become more sophisticated, the level of integration can be upgraded as well.

**scalability**

[RhythmLink](#) provides the capability to efficiently manage the huge volumes of data associated with large supply chains, as well as the number of users accessing it.

standards-based open environment

RhythmLink provides an integration environment that supports current and emerging technology standards in the areas of databases, object-oriented development, and distributed computing.

### **what types of applications or data sources can I integrate?**

RhythmLink is a multi-tiered, client-server solution that provides a single graphical interface which speeds integration of data sources and enterprise applications. The data sources can be relational or non-relational databases, or contain various types of file structures. RhythmLink also allows other applications such as ERP systems and other partner applications to interact with RHYTHM through standard messaging technologies such as CORBA and DCOM. Partner applications with specific integration points such as SAP™, SSA, and Oracle can also be accommodated.

### **key capabilities of RHYTHM data integration**

#### **comprehensive database integration**

RhythmLink utilizes popular middleware tools including SequeLink, EDA/SQL, and standards such as ODBC to access relational databases including Oracle, Informix, and others. Native database access to Oracle is also supported in addition to non-relational databases such as IMS, AS400, and other popular data sources. The data within these databases can be imported into or exported from RHYTHM based on triggering events or these transfers can be initiated on demand. Users can view the data within a RHYTHM model as though it were another relational database through ODBC-compliant clients. An Excel interface to directly view and manipulate planning information via a spreadsheets is also supported.

#### **integration with ERP systems**

RhythmLink supports closed-loop integration between the RHYTHM family of products and other ERP systems. The benefits of this tightly-coupled integration include:

- allowing users to enter information into one system and ensure the accessibility and accuracy of the same information across the other application, eliminating duplicate data entry,
- providing data entry and ownership at one point-the source module-and synchronization of reference (common) data as necessary in a business environment,
- allowing for real-time or near real-time planning and addressing rapidly changing environments and true "what-if" capability based on the current status of the supply chain,
- providing superior performance and the rapid transfer of data,

- providing interfaces that are predefined, and that do not need to be rewritten for each implementation.

### **"quick-start" integration capabilities**

Using ASCII file transfer and a proprietary batch client interface, RhythmLink provides the capability to create a "quick-start" interface that allows users to begin using the RHYTHM application immediately while a more robust interface is being built in parallel. The cost of this "quick-start" interface is easily recouped within a short time frame from the results of the RHYTHM implementation.

### **application integration**

Using open technologies such as DCOM or CORBA, applications can interact with RHYTHM through distributed objects. i2 even supplies standard 'planning objects' that can be utilized or mapped to by the cooperating application.

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## demand planning

*In today's dynamic business environment, understanding demand and managing the factors that impact demand has become increasingly critical to the success of many organizations. Whether planning across a worldwide portfolio of businesses, divisions, plants, product families, or individual products, there are a tremendous number of factors to consider in order to efficiently drive revenues and reduce supply chain costs. Seasonal fluctuations, economic conditions, promotions, pricing, competitors' activities, and the actions of key customers are but a few of the influences that impact demand.*

**is everyone working to the same plan?**

Often, various departments such as manufacturing, logistics, sales, marketing, and finance create their own forecasts which are used to guide frequently conflicting objectives. Such approaches are commonplace since demand planning tools do not support the ability to generate, store and evaluate multiple plans, include input from any number of internal or external sources, consider causal factors, and effectively manage consolidation of conflicting plans. RHYTHM Demand Planning fully supports the internal collaboration that aligns all of the various plans into a consensus plan.

**what planning tools are necessary to effectively manage demand?**

RHYTHM provides a demand planning environment that combines the best statistical techniques, unlimited causal factors, and the ability to manage multiple inputs with best-in-class, multi-dimensional data representation and analysis in a user-friendly environment. Using RHYTHM Demand Planning capabilities, planners can accurately model their business in real-time helping users to be more responsive. Through the use of the RHYTHM Demand Planning solution, organizations can greatly reduce forecast error, increase planning accuracy, and link the planning process directly to strategic goals.

**how can demand be impacted or "shaped"?**

Many businesses experience demand fluctuations based on factors over which they can exert some degree of control. For example, businesses driven by promotions can use RHYTHM Demand Planning to develop plans based on various strategies, and then analyze each to determine which best meets strategic or tactical goals. RHYTHM Demand

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Planning was the first commercial solution to support promotional response factors based on syndicated POS data from companies such as A. C. Nielsen and IRI, and it continues to set the standard for integration of this and other external data.

## **key capabilities of RHYTHM demand planning**

### **a multi-dimensional representation of demand**

RHYTHM Demand Planning is unique in its ability to manage demand in multiple dimensions. Dimensions are the different levels or definitions through which the user can interact with the data. These dimensions might be geography, products, plants, distribution centers, accounts or customers, or time. Through this capability, users of RHYTHM Demand Planning can manipulate demand plans in the context of their part of a business process. For example, a sales manager might manage demand by customer or region, a product manager by product line, a plant manager by production line, and a financial manager by product line profitability.

### **flexible forecasting techniques**

RHYTHM Demand Planning is an industry leader in providing open access to virtually any method of forecasting. In its standard form, RHYTHM Demand Planning is delivered with 35 forecasting techniques and the ability to automatically pick the best model for a specific scenario. Plus, it includes an open framework for incorporating external techniques and a powerful scripting capability through which users can create their own models.

### **superior allocation capabilities**

To improve the allocation process, RHYTHM Demand Planning has completely uncoupled the forecasting process from the allocation process. Any technique used to forecast can be used to allocate. Additionally, any new technique created may be used exclusively for allocation. For example, a simple moving average may be an insufficient forecasting technique due to price changes or market activities; however, it may represent an appropriate technique for allocation. The selected technique or techniques can be measured for effectiveness by defining the historical time periods in which the technique is simulated. Changes can also be made at any level which can be allocated to the appropriate levels down to the detailed product, geography or customer levels.

### **intuitive navigation and workflow for improved productivity**

Demand Planning adds efficiency and flexibility through an intuitive user interface and additional features designed for greater usability. Features such as "Bookmarks" enable planners to save an unlimited number of views of the demand plan as they develop forecasts and models and

return to them as needed.

### **internet focused**

RHYTHM Demand Planning provides full access to demand planning information across intranets and the Internet. There is no requirement to build custom web pages or user interfaces. The underlying business objects of RHYTHM Demand Planning can be invoked by a standard web browser.

### **enabling technology**

The RHYTHM Demand Planning database is optimized for speed and performance and uses the most advanced relevant technologies. Central to the object-oriented architecture is an OLAP (OnLine Analytical Processing) engine and full support for OLE (Object Linking and Embedding) and DDE (Dynamic Data Exchange) in a scalable client-server environment. This architecture is complemented by a highly configurable user environment which is optimized for performance and ease of navigation through complex data structures.

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**distribution planning**

*RHYTHM's Distribution Planning solution enables logistics managers to create an operating plan that meets the global objectives of the supply chain. Distribution Planning is a subset of capabilities within RHYTHM Supply Chain Planner's tightly-integrated planning architecture. In contrast with traditional distribution planning systems such as Distribution Requirements Planning (DRP), RHYTHM's technology and architecture extends the current set of capabilities to address new and emerging challenges for distribution-centric supply chains.*

**solutions for...**[advanced scheduling](#)[data integration](#)[demand planning](#)[distribution planning](#)[manufacturing planning](#)[order promising](#)[transportation planning](#)**what differentiates RHYTHM's distribution planning solution?****integrated planning process**

RHYTHM provides an integrated planning process that breaks artificial boundaries. It considers the entire planning process—from manufacturing, through distribution and transportation—within a single integrated model.

**flexible supply chain representation**

The modeling environment allows accurate representation of complex distribution networks with multiple sourcing options, overflow locations, co-packing operations, assembly requirements, and alternate manufacturing and transportation options as well as constraints that are taken into account when deriving plans.

**planning decisions mapped to financial goals**

The RHYTHM distribution planning solution incorporates constraint-based Master Planning capabilities that help determine when, where, and what quantity to produce, purchase, ship, and store for intermediate and finished goods. These plans can be optimized to maximize Return on Assets (ROA), and profitability while meeting customer service and inventory targets.

**immediate visibility of supply chain problems**

RHYTHM allows planners to make and understand the consequences of complex, customer-specific trade-off decisions, since it plans at a more detailed level of data than traditional DRP systems.

**transportation-enabled planning**

RHYTHM considers all supply chain constraints simultaneously, including transportation constraints and opportunities such as truck capacity and weight, alternate

modes, and availability of downstream resources such as loading docks or shrink-wrap operations, to generate a *globally* feasible plan.

**speed and scalability breakthroughs**  
RHYTHM's technical architecture provides speed and scalability breakthroughs that are critical in solving today's complex supply chain problems.

## **key capabilities of RHYTHM distribution planning**

### **comprehensive view of the entire supply chain planning process**

The integration of Distribution Planning with other functions - such as Demand Planning and Manufacturing Planning - provides greater management and control over the promotion planning process or channel management to enable sophisticated allocation methods when demand is greater than supply.

### **extensive supply chain modeling**

Supply chains are becoming increasingly complex. By leveraging object-oriented design methodologies, RHYTHM's architecture supports an unlimited number of levels within the supply chain model - extending from suppliers to customers - to easily reconfigure the supply chain network as business conditions change.

### **superior customer service via exception- based management**

Traditional solutions only identify a list of planning problems. RHYTHM's *Problem-Oriented Planning* techniques go beyond this to allow a planner to "drill-down" into the details via a "point-and-click" user interface to quickly resolve a specific problem. Planners also have flexibility to resolve the problem interactively with the system or by using one of many auto-resolution methods supported within RHYTHM.

### **integrated support for VMI, ECR, and continuous replenishment**

RHYTHM provides support for Vendor Managed Inventory™ (VMI)™, as well as the replenishment and safety stock policies implemented at these inventory locations. The ability to prioritize inventory assigned to VMI™ customers in relation to inventory that will be used to satisfy other customer demand, forecast or safety stock is a significant improvement over traditional VMI™ approaches.

### **rapid what-if simulation**

RHYTHM enables planners to evaluate multiple planning strategies and select the plan that best meets the desired customer service levels with respect to transportation and manufacturing constraints. By leveraging RHYTHM's

Master Planning capabilities, planners can maximize the overall goals of the enterprise such as Return on Assets (ROA) and profitability targets.

**sophisticated safety-stock strategies**

RHYTHM supports statistical, manual, forward coverage, as well as sophisticated time-phased safety stock strategies to support Product Life Cycle Management where high service levels are required during a new product introduction, but not as important as when the product is phased out. RHYTHM also propagates changes in safety stock levels upstream and downstream to identify constraints in other parts of the supply chain.

**flexible user interface and reporting**

RHYTHM's user interface is designed to be highly customizable by users to support their preferences, with multiple ways to view and manipulate the plan and supporting data, and the ability to create custom reports.

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## manufacturing planning

i2 Technologies' solution for manufacturing planning takes a global approach to intelligently optimize the performance of a manufacturing operation. By analyzing what is best for the manufacturing organization or supply chain as a whole, RHYTHM simultaneously manages multiple and dynamic constraints to develop a feasible operating plan for plants, departments, work cells, or production lines. The resulting plans meet the customer's delivery requirements and business objectives.

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### how does RHYTHM solve complex planning problems?

RHYTHM manages complex manufacturing operations that involve large numbers of resources and operational steps in real time, as well as solves common planning problems found in factories, such as managing complex bills of material, alternate routings, and optimizing machine setup sequences. This produces an intelligent and feasible production plan along with the associated set of manufacturing and purchasing recommendations. The RHYTHM Manufacturing Planning solution can be used in conjunction with Advanced Scheduling to determine the optimal sequence of operations at each resource.

### how does RHYTHM support business objectives?

With its global visibility and constraint management capabilities, RHYTHM creates feasible plans that reflect real-world manufacturing conditions in order to meet manufacturing goals such as improving due-date performance, cutting lead times, improving throughput, and reducing inventory and operating expenses.

### how does RHYTHM differ from MRP in deriving a feasible plan?

Traditional MRP II (Manufacturing Resource Planning) logic uses a sequential approach to derive a plan. First, a Master Production Schedule (MPS) is created, which provides the basis for Material Requirements Planning (MRP), and, after this step, attempts to perform Capacity Requirements Planning (CRP). Unfortunately, this approach considers material and capacity as independent variables at each stage that results in an infeasible plan. To resolve this, MRP's logic advocates iterating this sequence multiple times to adjust for changes made at each step. Because RHYTHM simultaneously considers all constraints —material, capacity, operators, tools, etc.—it generates a

feasible operating plan in a single pass. The entire plan is generated in a fraction of the time since RHYTHM computes the plan in memory.

## **key capabilities of RHYTHM manufacturing planning**

### **problem-oriented planning that enables immediate resolution**

From the Problem Window, RHYTHM enables planners to instantly "drill-down" into the details of a problem by using "point-and-click" actions, allowing planners to resolve the problem by expediting material, adding capacity by running additional shifts, or other available options. This capability goes beyond simple exception-based reporting which only identifies problems, but cannot resolve them.

### **comprehensive support for both finite and infinite capacity planning**

Infinite capacity planning is an important step in formulating an optimal, finite capacity plan. Initially, RHYTHM creates a plan that considers finite materials, but infinite capacity to illustrate the ideal level of resource capacity needed to meet customer demand. In infinite capacity planning mode, RHYTHM flags the overloaded resources, allowing the user to take corrective actions to meet the delivery date. However, the user also has the choice of using RHYTHM's constraint-based, load-balancing algorithms to automatically create an optimal finite capacity constrained plan.

### **accurate real-time due-date quoting capability improves customer service**

RHYTHM's memory-resident planning engine is extremely fast where plans are generated in minutes compared to hours in traditional MRP systems that use database-driven engines. Its architecture supports a highly flexible modeling environment that allows users to model their manufacturing operations at a detailed level. RHYTHM can be integrated with order management systems where customer service representatives can confidently quote accurate delivery dates in seconds or determine the status of a customer order in real-time, based upon current production and inventory status.

### **configurable to fit multiple environments**

RHYTHM Manufacturing Planning solutions support assemble-to-order, configure-to-order, make-to-order, make-to-forecast, build-to-stock, and hybrid environments. They also support discrete, batch-process, and rate-based environments in all major industries including metals, high tech, automotive, consumer packaged goods, industrial products, pharmaceuticals, and aerospace and defense industries.

### **tight integration with existing systems**

Using RhythmLink™, i2 Technologies' integration tool, RHYTHM can be integrated with MRP, ERP, and transactional databases. Whether the enterprise has made an investment in a client-server ERP system or is using legacy systems, RhythmLink provides quick and effective integration. Further, through real-time interfaces to MRP and ERP systems from SAP™, Oracle, and SSA, RHYTHM uses the data maintained on these transaction systems to provide advanced planning and optimization capabilities.

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*Transportation planning is concerned with deriving a demand-driven, feasible plan for transportation resources that are required to move inventory from one location in the supply chain to another. i2 Technologies offers a complete transportation solution that encompasses the tactical, operational, and execution needs of the supply chain. The solution suite is based on capabilities within RHYTHM as well as other solutions through strategic partnerships.*

**what are the many levels of a complete transportation planning solution?*****the tactical level***

Tactical planning focuses on deriving plans that synchronize the supply of resources with demand. This is an integral part of the Master Planning function in an enterprise which helps determine when, where, and what quantity to produce, purchase, ship, and store for intermediate and finished goods. This planning activity maximizes Return on Assets (ROA) and profitability while meeting customer service and inventory targets. As a result, transportation-related decisions made at the tactical level drive subsequent decisions made at the operational and execution levels. Unlike traditional solutions that consider transportation only as an execution-level activity, RHYTHM offers the potential to maximize transportation savings by creating a feasible plan that is aligned with a company's ROA, profitability, and customer service goals.

***the operational level***

As the plan nears execution, decisions regarding load consolidation, mode/carrier selection, routing and scheduling need to be made. Using information within RHYTHM or from other partner components, RHYTHM consolidates orders or shipments into loads, selects the appropriate mode and carrier, as well as schedules and routes the loads. All planning is done respecting the constraints of the transportation system including container capacity, available equipment, and transit times.

***the execution level***

With real-time links to dispatching and load tracking, the RHYTHM Transportation Planning solution manages the complete execution of transportation processes with detailed information on transportation parameters including cost, service performance, and transit times.

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## **key capabilities of RHYTHM transportation planning**

### **transportation-enabled planning: a new supply chain perspective**

Transportation is perhaps the single most important constraint in distribution-centric supply chains. However, traditional supply chain planning approaches consider transportation constraints *after* DRP (Distribution Requirements Planning) has derived inventory plans. Solution providers using this approach argue that synchronization of distribution and transportation can be achieved by multiple iterations between distribution and transportation—but in practice, this is rarely feasible. Since RHYTHM *simultaneously* considers distribution, manufacturing, and transportation constraints such as transit times, truck capacity and weight, alternate modes, as well as the availability of downstream resources including loading docks or shrink-wrap operations, it generates a globally feasible plan.

### **visibility and functional synergy through superior integration**

Given the dynamic nature of supply chains, frequent replanning and evaluating of alternatives is a critical activity. The level of integration between RHYTHM and other solutions from strategic partners provides visibility into the transportation planning process previously unavailable to planners outside the transportation domain. For instance, using information about transportation constraints, distribution plans can now be optimized resulting in a supply chain plan with transportation elements included (e.g., vehicle/carrier selection, shipment costs, ship date/time, arrival date/time, etc.). This transportation planning and subsequent visibility in RHYTHM provides the planner the opportunity to refine the entire plan at one time and see the results immediately. Transportation planning is integrated with all other supply chain activities and RHYTHM provides the tools to manage it in conjunction with other resources.

### **improved freight optimization based on constraints and opportunities**

The RHYTHM Transportation Planning solution dynamically considers multiple hublocations, pool points, service providers as well as other constraints across an entire enterprise or multiple enterprises when consolidating and routing shipments through the transportation network. This results in significant cost and service advantages. By incorporating functionality from the VENTURE™ Freight Optimizer\*, the RHYTHM Transportation Planning solution utilizes a set of proprietary, heuristic, rules-based, and mixed integer solvers to yield the best solution or "optimal" load plan.

### **comprehensive freight management capabilities**

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VENTURE™ Freight Management\* is a fully integrated, transaction-based transportation management system that improves the speed, efficiency, and effectiveness of the transportation management process across the enterprise, or multiple enterprises. VENTURE Freight Management supports the activities necessary to manage and execute the full life cycle of the transportation process—from customer service/order management to financial settlement and performance measurement—for large shipping organizations such as manufacturers, retailers, and wholesale distributors, or for third-party logistics providers serving those shippers. Freight Management has saved customers between 5-20 percent of their transportation costs. Given that transportation costs range between 2-15 percent of most organizations' costs structures, the cost savings can be significant.

*\*The VENTURE Freight Optimizer and VENTURE Freight Management solutions are offered through a strategic partnership between i2 Technologies and InterTrans Logistics Solutions.*

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